

Research on the Reform of Ideological and Political Education in Electrical Courses

Dongqiu Xing¹ Xinshe Qi² Lihua Qi³

^{1,2,3} School of Information and Communication, National University of Defense Technology, Wuhan, Hubei 430035, China

¹Corresponding author.

ABSTRACT

There are many types of electrical courses with strong engineering characteristics, and the courses themselves contain rich ideological and political elements. This paper analyzes the current status and existing problems of ideological and political research in professional courses, and uses electronic technology and application courses as carriers to study, it constructs an integrated system of ideological and political education in courses from five dimensions: element mining, teaching mode exploration, supporting resource construction, teaching method refinement, and quality evaluation. This study and practice have certain reference significance for the reform of ideological and political education in electrical courses.

Keywords: *Electrical courses, Curriculum ideological and political education, Teaching reform, Research.*

1. INTRODUCTION

In December 2016, General Secretary Xi Jinping emphasized at the National Conference on Ideological and Political Work in Colleges and Universities that classroom teaching should be the main channel, and all types of courses should go hand in hand with ideological and political courses to form a synergistic effect [1]. In February 2019, the Central Committee of the Communist Party of China and the State Council issued "China Education Modernization 2035", which once again emphasized the importance of curriculum ideology and politics in colleges and universities. In March 2019, General Secretary Xi Jinping proposed at a symposium for teachers of ideological and political theory courses at the school that "we should adhere to the unity of explicit education and implicit education, tap into the ideological and political education resources contained in other courses and teaching methods, and achieve all-round education for all staff and students." In May 2020, the Ministry of Education issued the "Guidelines for the Construction of Curriculum Ideology and Politics in Higher Education Institutions", requiring all colleges and universities to comprehensively promote the construction of curriculum ideology

and politics. The new era military education policy also emphasizes "fostering virtue and educating people for fighting", effectively promoting the rooting of curriculum ideology and effectively improving the effectiveness of fostering virtue [2]. In November 2021, Director Wu Yan of the Higher Education Department of the Ministry of Education interpreted the spirit of the Outline at the National College Teacher Course Ideological and Political Teaching Ability Training Class, pointing out that more than 80% of college teachers are professional teachers, more than 80% of college courses are professional courses, and more than 80% of student learning time is professional learning. The research on curriculum ideology and politics in professional courses has become a hot topic in the curriculum construction of Chinese universities. Only by effectively strengthening and improving the "main force" role of professional course teachers, highlighting the "main battlefield" position of professional course teaching, and leveraging the "main channel" advantage of professional course classrooms, can the educating role of curriculum ideology and politics be effectively implemented. [3]

2. CURRENT SITUATION AND PROBLEMS

With the continuous advancement of social development, the construction of curriculum ideology and politics in colleges and universities has received widespread attention from the academic community. Many experts and scholars have explored it from various perspectives and ultimately formed a consistent understanding. Since 2020, more than 5000 academic papers on course ideology and politics have been publicly published nationwide, with significant results and phased achievements: clarifying the concepts and relationships between "ideological and political courses" and "curriculum ideology and politics", demonstrating the importance of curriculum ideology and politics construction, and providing the path and practical experience of curriculum ideology and politics construction. Regarding the research on curriculum ideology and politics in electronic technology courses, Dong Xiaowei established a "curriculum ideological and political" model to deeply explore and implement curriculum ideological and political teaching [4]; Gan Guomei, on the other hand, positioned her ideological and political goals in areas such as patriotism, professional ethics, and scientific thinking. She adopted a blended online and offline teaching model to carry out a "five step method of integrating knowledge and ideological and political education" teaching practice, incorporating ideological and political elements such as patriotism, Marxist philosophy, traditional culture, and inspirational education [5]; Zhao Shuling constructed a course ideological and political case library from five ideological and political dimensions: patriotism, scientific spirit, professional competence, legal awareness, and team consciousness, [6] providing valuable reference for the reform of curriculum ideology and politics; Cao Xinliang explored ideological and political elements in electronic technology courses from the aspects of devices, circuits, and electronic system design. He provided specific teaching cases and excavatable ideological and political elements, integrating patriotism, Marxist philosophy, traditional culture, and inspirational education into classroom teaching [7], providing ideological and political teaching materials and references for electronic information courses; In addition, some scholars have explored the organic integration of professional courses and ideological and political elements using the reform of ideological and political education in the course of "Fundamentals

of Electrical Engineering" as an example; Some scholars believed that the cultivation goals of curriculum ideology and politics in electronic technology internship courses should be carried out from the aspects of cultivating mechanical work style, improving professional qualities, and cultivating patriotism. The research of the above scholars is generally independent and one-sided, lacking systematic thinking, integrated design, and engineering advancement.

Electronic technology courses are a compulsory basic course group for students majoring in electronics, communication, and computer science. In previous training processes, they were usually subject-oriented, emphasizing knowledge transmission and skill training, and neglecting the shaping and guidance of values. At present, in the context of ideological and political education, there are common problems in curriculum ideology and politics of electronic technology courses, such as limited design of ideological and political concepts, narrow definition of ideological and political concepts, hard implantation of ideological and political elements, lack of methods for ideological and political infiltration, imprecise scale control, inappropriate integration timing, and unsatisfactory ideological and political effects. In order to effectively implement the fundamental task of "fostering virtue", it is urgent to establish a systematic ideological and political teaching strategy in the teaching of electronic technology courses in higher education, and to promote the smooth development of course teaching.

3. RESEARCH ON CURRICULUM IDEOLOGY AND POLITICS

The research on the reform of curriculum ideology and politics must be combined with the characteristics of the subject, and a set of standardized strategies for curriculum ideology and politics must be formed through multiple approaches, including the excavation of ideological and political elements, the construction of teaching models, the construction of supporting resources, the practice of teaching methods, and the evaluation of effectiveness.

3.1 *Exploring the Ideological and Political Elements of the Curriculum System*

The ideological and political elements are the soul of curriculum ideology and politics teaching. It is necessary to follow the "Guidelines for

Ideological and Political Construction of Curriculum in Colleges and Universities" issued by the Ministry of Education, and study the educational goals of ideological and political education in electronic technology courses from the aspects of adhering to the correct political direction, cultivating patriotism, transmitting core socialist values, and emphasizing the combination of professional learning and ethical and moral norms; On this basis, it is also necessary to combine the characteristics of the discipline, fully explore and expand, establish a mapping relationship between theoretical knowledge, practical skills and values, methodology application, materialist thinking penetration, resource conservation strategy, collaborative spirit cultivation, and scientific thinking cultivation, and classify ideological and political elements to provide rich ideological and political content supply for implementing curriculum ideological and political education concepts in such courses.

3.2 Exploration on the Teaching Model of Curriculum Ideology and Politics

The teaching mode is a platform for showcasing the teaching reform of curriculum ideology and politics. Based on the goals and elements of ideological and political education, combined with the content and characteristics of electronic technology courses, this study explores the laws of curriculum ideology and politics in electronic technology courses based on higher education. With the help of developmental education theory and teaching process optimization theory, the study constructs a "1+1+X" ideological and political teaching model. "1+1" means that each important knowledge point corresponds to an ideological and political element, and "X" means the way in which teaching content and ideological and political elements are integrated and the way in which ideological and political goals are reflected. For example, in the teaching of the "pulse generation circuit" knowledge point in the 555 timer, the ideological and political elements of "resource conservation strategy" can be integrated, and the "automatic extinguishing during the day and automatic lighting at night" of street lights can be introduced to achieve the ideological and political education goal of "light control induction, revitalizing the country through science and technology".

3.3 Building Supporting Resources of Curriculum Ideology and Politics

Based on the characteristics of the course content and the development history of the subject, there is a must to build a library of ideological and political elements and teaching cases, develop supporting textbooks, write course lesson plans, create electronic courseware, record series of micro courses and other ideological and political supporting resources to ensure that the ideological and political education concept of the course is "fully planned, systematically integrated into textbooks, closely integrated into lesson plans, visually integrated into courseware, vividly integrated into the classroom, and solidly integrated into the mind".

3.4 Condensing Teaching Methods of Curriculum Ideology and Politics

Electronic technology courses have strong practicality and significant engineering characteristics. Based on the concept of engineering education, develop and develop DIY projects that are close to daily life, integrating the core socialist values of "dedication, integrity, and friendliness" throughout the entire process of practical teaching, guiding students to learn electronic technology knowledge seriously with practical needs as the guide, striving to improve the living environment, and making their due contributions to the development of electronic information systems.

3.5 Improving the Quality Evaluation of Curriculum Ideology and Politics

The effectiveness of curriculum ideology and politics construction should ultimately be evaluated based on students' sense of achievement. Therefore, it is necessary to focus on the characteristics and job needs of students, balance the short-term and long-term effects of curriculum ideology and politics, formulate evaluation standards for ideological and political education in electronic technology courses, construct an evaluation system for curriculum ideology and politics, and continuously improve the education effectiveness of curriculum ideology and politics.

4. RESEARCH AND REFORM IMPLEMENTATION PLAN

4.1 Exploring Ideological and Political Elements

Based on the characteristics of the course and the cognitive level of students, taking the "Electronic Technology and Applications" course in the spring semester of the first year of communication major as an example, this paper carefully sorts out the 33 knowledge and skill points contained in the 7 knowledge modules of the course, and deeply explores the ideological and political elements contained in the course from the

aspects of course culture, disciplinary development history, and anecdotes of famous scientists: the first is to analyze the opportunities and challenges faced by the industry's development, and firmly adhere to the ideal belief of promoting the country through science and technology; The second is to tell the stories of scientists and advocate for the realm of life with dedication and refinement; The third is to explore the philosophical ideas contained in the curriculum and cultivate dialectical thinking ability; The fourth is to promote the value concept of seeking truth and pragmatism, and practice the spirit of craftsmanship that strives for excellence. The framework for extracting ideological and political elements from the curriculum is shown in "Figure 1".

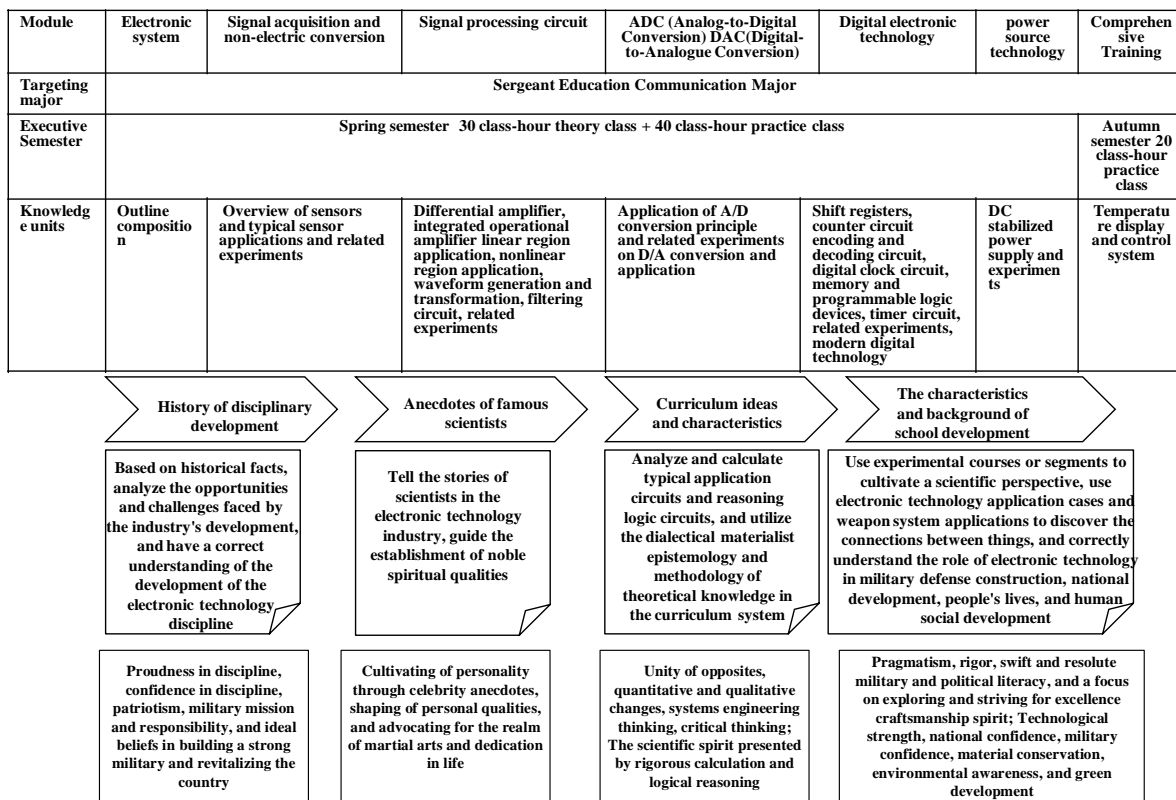


Figure 1 Framework for exploring curriculum ideological and political elements of "Electronic Technology and Applications".

4.2 Review and Revision of Ideological and Political Elements

Firstly, the professional basic course teachers complete the excavation and extraction of ideological and political elements in the course of "Electronic Technology and Applications", and then submit to the ideological and political teachers for cross review and revision and improvement.

The main content includes: whether the names of ideological and political elements are accurate, whether their meanings are understood correctly, whether teaching cases or examples are appropriate, whether further refinement and sublimation are needed, and providing constructive suggestions on the ways and methods of integrating ideological and political elements into cases or examples. The teachers of professional basic courses, based on the opinions and suggestions of ideological and

political teachers, have revised and improved the ideological and political elements of electronic technology that have already been excavated, forming the "Electronic Technology and Application Curriculum Ideological and Political Element Library".

4.3 Construction of Curriculum Ideology and Politics Teaching Model

According to the teaching content, teachers should distinguish between theory and experiment,

extract knowledge and skill points, integrate ideological and political elements, design ideological and political strategies, select corresponding teaching methods, and construct a "1+1+X" ideological and political teaching mode: "1+1" means that one knowledge or skill point corresponds to one ideological and political element, and "X" means the integration method of ideological and political elements. Example of theoretical teaching is shown in "Table 1" and experimental teaching example is shown in "Table 2".

Table 1. Example of curriculum ideology and politics in theoretical teaching

Content	Description
Class A power amplifier circuit	Knowledge point
Building a conservation-minded society	Curriculum ideological and political elements
The reasons for low efficiency of Class A power amplifiers	Integration points of ideological and political elements
The maximum value of circuit output power is $P_{o\max} = \frac{V_{CC}^2}{2R_L}$, which shows that the power of the power supply is a constant, while the power of the DC power supply is $P_V = \frac{2V_{CC}^2}{R_L}$. Therefore, the maximum efficiency is the maximum output power divided by the power of the power supply, which is approximately 25%. This shows the characteristics of Class A power amplifiers: The output waveform has no distortion, but the efficiency is extremely low. The real reason for this is that in Class A power amplifiers, in order to ensure the normal emitter current, the constant current source always works, providing static current to the circuit. For example, this is like a faucet. When we don't need to receive water, the faucet continues to flow outwards, causing waste of water resources. We certainly hope that when not receiving water, the faucet will not flow outward. When it is necessary to receive water, the water will flow out again, and the amount of water flowing out will change according to our needs. Analogous to the design of circuits, based on the idea of resource conservation, it is hoped that when the input signal is zero, the output power of the power supply will be zero. As the input signal increases, the output power of the power supply will also increase, which can achieve on-demand distribution. Therefore, the constant current source in Class A power amplifier circuits can be removed, and Class B complementary symmetric power amplifier circuits can be introduced.	Integration methods of analogical teaching
The shortage of resources is a major issue facing the construction of a socialist moderately prosperous society. When explaining the low efficiency of Class A power amplifiers, using the analogy of water flowing from a faucet, it is intuitive and natural to lead students in designing the next knowledge point circuit, inspiring them to save without any small matters. Circuit design serves the construction of a resource-saving society.	Educational function of ideological and political elements

Table 2. Examples of curriculum ideology and politics in theoretical teaching

Content	Description
161 Counter function test	Skill points
The spirit of craftsmanship	Curriculum ideological and political elements
Troubleshooting techniques for DIY twenty-four base counter circuit function	The integration points of ideological and political elements

Content	Description
In the spring semester of 2022, an electronic technology basic experimental box was used for experiments, and students were required to follow the steps in building the circuit. However, during the experimental acceptance process, functional errors were still found. Two teachers checked the experimental circuit one by one in person, and recorded the inspection and testing process in detail until the circuit function was normal. Throughout the process, students can see how teachers approach debugging circuits.	Integration methods of practical training
While helping students troubleshoot circuit faults, teachers influence students with the behavior, cultivate their spirit of dedication and continuous improvement, persist in quality, expand their logical thinking, and stimulate their interest in exploring the development laws of things.	Educational function of ideological and political elements

4.4 Common Methods and Techniques for Refining Curriculum Ideology and Politics

Focusing on the philosophical ideas contained in the curriculum, teachers can emphasize the teaching method of lecturing and cultivate students' dialectical thinking ability; Focusing on heuristic teaching methods for ideological and political elements related to anecdotes of scientists and celebrities, teachers can guide students to enhance their life horizons; Focusing on ideological and political elements related to cultivating work style and quality, teachers can emphasize practical training teaching methods, and cultivate students' spirit of striving for excellence as craftsmen; Focusing on the ideological and political elements hidden in the application of industry development technology, teachers can pay attention to the discussion based teaching method to touch students' sense of responsibility and mission, stimulate their patriotism and national spirit.

4.5 Developing an Evaluation Plan for the Effectiveness of Curriculum Ideology and Politics

Based on the sense of achievement of students, there is a must to develop an evaluation plan for curriculum ideology and politics, and comprehensively measure the effectiveness of curriculum ideology and politics from multiple perspectives such as academic performance, maintenance style, and scenario setting and handling.

5. CONCLUSION

This paper explores the reform and practical research of curriculum ideology and politics in electronic technology courses from five aspects. The practice shows that when conducting

curriculum ideology and politics in electronic technology courses, attention should be paid not only to the transmission of traditional theoretical knowledge and the cultivation of practical skills, but also to the clever implantation of ideological and political elements in the teaching process; there is a necessity to design around the core literacy of electrical courses, as well as to conceal correct values and essential character elements, and naturally integrate the connotation of curriculum ideology and politics into the course content to achieve the goal of teaching and educating students. In the construction and promotion of curriculum ideology and politics, it is necessary to coordinate the efforts of three levels of institutions, namely the joint efforts of the college, department, and department, to jointly promote top-level planning and fine execution. In addition, it is a must to encourage and support all teachers, actively explore the reform of curriculum ideology and politics, continuously optimize and improve teaching methods, and strive to improve the level of moral education, so as to integrate the concept of curriculum ideology and politics into the process of talent cultivation, truly achieving both education and talent cultivation.

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REFERENCES

- [1] Xinhua News Agency, Xi presides over a symposium for teachers of ideological and political theory courses in the school [OB/OL]. http://www.gov.cn/xinwen/2019-03/18/content_5374831.htm, 2019-03-18.

- [2] Ministry of Education, Guidelines for the Construction of Ideological and Political Education in Higher Education Curriculum [OB/OL].
http://www.moe.gov.cn/srcsite/A08/s7056/202006/t20200603_462437.html, 2020-06-01.
- [3] Wu Yan, Comprehensively Promote the High-quality Construction of Curriculum Ideology and Politics in Colleges and Universities [OB/OL].
https://m.eol.cn/toutiao/202111/t20211124_2178785.shtml, 2021-11-26.
- [4] Dong Xiaowei, Ye Qing, Cui Jian, Huang Ming, Teaching Reform Practice of "Course Ideology and Politics" in Electrical Engineering Majors: Taking the Course of "Analog Electronic Technology" as an Example [J]. China Plant Engineering, 2023(07), 249-251.
- [5] Gan Guomei, Qin Binyin, Ma Qingxiu, Huang Yanhu, The "Five Step Method" of Integrating Knowledge and Ideological and Political Education: A Practical Exploration of Reforming Ideological and Political Education in Simulated Electronic Technology Courses [J]. Computer Knowledge and Technology, 2023(7), 128-130.
- [6] Zhao Shuling, Luo Xiao, Chen Dehai, Construction and Practice of Ideological and Political Case Database for Electrical and Electronic Technology Courses [J]. Journal of Electrical and Electronic Education, 2023(8), 114-117.
- [7] Cao Xinliang, Yang Hongxia, Li Jianxin, Reform and Practice of Ideological and Political Teaching in Electronic Technology Course [J]. Journal of Electrical and Electronic Education, 2023, (6), 101-104.